



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,346	11/20/2003	George A. Pavlath	NGC-153/000060-199	1241
32205	7590	03/11/2005	EXAMINER	
PATTI & BRILL ONE NORTH LASALLE STREET 44TH FLOOR CHICAGO, IL 60602			CHIEF, DINH D	
			ART UNIT	PAPER NUMBER
			2883	

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/718,346

Applicant(s)

PAVLATH, GEORGE A.

Examiner

Erin D. Chiem

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/22/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Office Action is in response to amendment received on December 15, 2004. In accordance with the amendments, claims 1-8, 11, and 13-23 are amended, claims 24 and 25 are have been added. Claims 1-25 are currently pending.

#### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on November 20, 2003 was considered in the First Office Action.

#### ***Claim Objections***

The Examiner withdraws the claim objections in claim 11 and 12 regarding the lack of antecedent basis.

#### ***Claim Rejections - 35 USC § 112***

In light of the amended claims, the Examiner withdraws the claim rejections made under 35 USC § 112 on claims 1-23.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vengsarkar (US 5,430,817) in view of Orthonos et al. (Artech House, Inc., 1999) and in further view of Golberg et al. (US 6,731,837) and Michal et al. (US 6,025,915).

Art Unit: 2883

4. Vengsarkar discloses an apparatus comprising a light source (col. 4, line 54), a first long period grating (Fig. 5, 57) optically coupled with the light source; and an amplification fiber (54) that is optically coupled with the long period grating; wherein the light source send one or more pump optical signals (56) to the long period grating; wherein the long period grating transmits the one or more pump optical signals to the amplification fiber; wherein the amplification fibers absorbs a subset of the one or more pump optical signals and emits one or more output signals; where in the long period gratings attenuates the one ore more output signals. Long period gratings are well known, will be proven in the subsequent sources, to attenuate (or also known as loss, SearchNetworking.com) for it was designed to discriminate by rejecting desired wavelengths dependent on apparatus building specifications. Hence, the pump signals sent through by element 56 into the long period grating 57 is pumped at a range of wavelengths and the output wavelength sent from long period grating 58 is without a range of wavelength, or can also be interpreted as “substantially same second wavelength” relative to the signal sent from long period grating 57 “substantially first wavelength.” As closely disclosed by Vengsarkar 1 in how to space the gratings in such a way that the gain flattening or more well known as attenuation can be more uniform over a range of wavelengths of 1530 – 1560 (col. 3 line 65 - col. 4, line 14).

Furthermore, the limitations regarding reducing or promoting decrease in backreflections and the limitations regarding the residual signals from the gratings are merely characteristics of the long period Bragg gratings. However, Vengsarkar does not disclose “long-period Bragg gratings” but only referred to as long period gratings as the optical elements for attenuating the unused pumped energy. Furthermore, Vengsarkar

Art Unit: 2883

does not disclose employing fusion splice as the coupling means for the separate elements: light source, long period gratings, pumping elements, and the erbium doped fibers. And finally, Vengsarkar does not disclose sending the output signal into an optical gyroscope.

5. Orthonos et al. teach in the fundamental theories of Bragg gratings that long period gratings are a species of Bragg gratings. Orthonos cross referenced to Vengsarkar 2 as the scientist who found the characteristics of the long period gratings can be applied as low-loss band-rejection filters. The periodicity of the long period grating is chosen to couple light from the guided single mode  $LP_{01}$  of the fiber into the forward propagating cladding modes, where it is lost due to absorption, such as erbium doped amplification fibers, and scattering. The phase-matching condition that determines the exact periodicity of the grating; for two forward-propagating modes (ie., first wavelength and second wavelength) dictates that the period of the Bragg grating must be long or longer than the transmitting wavelength. Such forward propagating coupling is key to the sought after characteristic of low backreflection in long-period Bragg grating (Orthonos, pp. 142 – 143).

6. Goldberg et al. disclose an optical fiber amplifiers and lasers and optical pumping device which employ fusion splicing through out the device for the purpose of low loss coupling, well-known in the art, and for the removal of pump light in the cladding [0058].

7. Michal et al. teach a system for performing scale factor stabilization of a broadband optical signal used in fiber optic gyroscopes employing a broadband light source, pump laser diode, and placing the gyroscope in line with the bandpass filter which stabilize the centroid wavelength. This is critical in the apparatus since the

Art Unit: 2883

bandpass filter only allow a narrow band of wavelength 1540 – 1570 nm wavelengths to pass, the centroid wavelength, and attenuate the rest of the wavelength. The linearization scale factor is determined by the output optical signal sent to a photodetector convert the optical signal intensity of the interference pattern produced by combining the waves that have propagated through the sensing coil to an electrical signal. The scale factor allows the measure of the rotation of the gyro and the phase information to be correlated (col. 5, line 13-42). Michal et al. teaching of scale factor stabilization of a broadband fiber source used in fiber optic gyroscopes is for the purpose of reducing the linearization scale factor error when the sensing coil in such measuring apparatus is exposed to ionization radiation which cause the centroid wavelength to shift. Furthermore, Michal et al. teach the filtering of pumped broadband input signal through the coupling of modes into the cladding of the fiber through hi-pass filter and low-pass filter result in the narrowband output (Fig. 7B, col. 4, line 37-59).

8. Since Vengsarkar, Orthonos et al., Goldberg et al. and Michal et al. are all from the same field of endeavor, the purpose disclosed by Orthonos et al., Goldberg et al. and Michal et al. would have been recognized in the pertinent art of Vengsarkar.

9. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to: 1) Alternatively label spectral shaping device such as a long period grating as “long period Bragg grating” since long period grating is a species of Bragg grating. 2) In a measuring system which employs a broadband light source, a pump laser diode, Erbium doped amplification fibers, long period Bragg gratings, and other optical components such as photodetectors and optical gyroscope that it would have been obvious to employ fusion splicing in place of the broadly claimed six different

Art Unit: 2883

splices indicated by Michael et al. in Fig. 5, in which the Examiner respectfully point out reads on all of the positions of the Applicant's claimed positions of first, second, third, and fourth splice, since it is the economical beneficial relative to mechanical splices which may employ extraneous components such as V-shaped metal clamps, see non-patent literature "Lennie Lightwave's Guide to Fiber Optics: Termination and Splicing" for more comparative details. Another benefit is the low loss that fusion splicing provide to the system. And most importantly, fusion splicing double cladding fibers to remove residual pump/residual light in the cladding. 3) It is clearly obvious at the time the invention was made to a person having ordinary skill in the art to use the long period bandpass filter that Vengsarkar taught that is less susceptible to ionization radiation to stabilize the centroid wavelength for providing more correct linearization scale factor such that the rotation of the gyroscope and phase information of the optical signal may be correlated to extract parameters of interest. Such measuring instrument is most beneficial in harsh and radiation environment.

### *Response to Arguments*

10. Applicant's arguments with respect to claim 1-24 have been considered but are moot in view of the new ground(s) of rejection. See new grounds of rejection above.

### *Conclusion*

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sorin et al. teach a method of filter in which two claddings are employed to further couple the undesired modes from the transmitting mode in the core.

Art Unit: 2883

Also Ghera et al. teach the similar system that the Applicant disclose, however, the Examiner chose not to use Ghera et al. as a reference for the close proximity of the reference's date to the Application effective filing date.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin D. Chiem whose telephone number is (571) 272-3102. The examiner can normally be reached on Monday - Thursday 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Erin D Chiem  
Examiner  
Art Unit 2883

edc



Frank G. Font  
Supervisory Patent Examiner  
Technology Center 2800



Application/Control Number: 10/718,346

Page 8

Art Unit: 2883